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PATENT

Attorney Reference Number 3382-66128-01  
Application Number 10/622,284

### Claims

1. - 21. (Canceled)

22. (Original) A method of decoding a field-coded macroblock comprising an one or more intra-coded blocks field and a second field, the method comprising:

finding a DC differential for a current intra-coded block in the intra-coded field macroblock;

selecting a DC predictor from a group of candidate DC predictors, wherein the group of candidate DC predictors comprises DC values from blocks adjacent to the current block, wherein a candidate DC predictor is a missing candidate DC predictor if the candidate DC predictor is not intra-coded, and wherein the selected DC predictor is a non-missing candidate DC predictor; and among plural candidate blocks according to a set of DC predictor selection rules, wherein the plural candidate blocks include a top block above the current block, a left block left of the current block, and a top-left block above and to the left of the current block, and wherein the set of DC predictor selection rules indicates the selected DC predictor as follows:

if the top-left block, the left block, and the top block are intra-coded, the selected DC predictor depends on respective DC values of the top-left block, the left block, and the top block;

if the top-left block is not intra-coded but the left block and the top block are intra-coded, the selected DC predictor depends on the respective DC values of the top block and the left block;

if the left block is not intra-coded but the top block is intra-coded, the selected DC predictor is the DC value of the top block;

if the top block is not intra-coded but the left block is intra-coded, the selected DC predictor is the DC value of the left block;

if the left block is not intra-coded and the top block is not intra-coded, DC prediction is skipped for the current block;

obtaining a DC value for the current block, wherein the obtaining comprises:

if DC prediction is skipped for the current block, using the DC differential as the DC value for the current block; and

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if DC prediction is used for the current block, adding the selected DC predictor to the DC differential[[]]; and  
using the DC value in reconstruction of the current block.

23. (Canceled)

24. (Currently Amended) The method of claim 22 wherein ~~a candidate DC predictor is a missing candidate DC predictor if the candidate DC predictor~~ any of the plural candidate blocks that is outside a picture boundary is treated as not being intra-coded according to the set of DC predictor selection rules.

25. (Canceled)

26. (Currently Amended) A computerized method of encoding an interlaced macroblock, the method comprising:

selectively performing DC prediction for a current block in the interlaced macroblock, wherein the selectively performing DC prediction comprises selecting a DC predictor from among plural candidate blocks according to a set of DC predictor selection rules adding a selected DC predictor for the current block to a DC differential, wherein the plural candidate blocks include a top block above the current block, a left block left of the current block, and a top-left block above and to the left of the current block, and wherein the set of DC predictor selection rules indicates the selected DC predictor as follows:

if the top-left block, the left block, and the top block are intra-coded, the selected DC predictor depends on the respective DC values of the top-left block, the left block, and the top block;

if the top-left block is not intra-coded but the left block and the top block are intra-coded, the selected DC predictor depends on the respective DC values of the top block and the left block;

if the left block is not intra-coded but the top block is intra-coded, the selected DC predictor is the DC value of the top block;

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if the top block is not intra-coded but the left block is intra-coded, the selected DC predictor is the DC value of the left block;

if the left block is not intra-coded and the top block is not intra-coded, DC prediction is skipped for the current block; and

selectively enabling performing AC prediction for blocks the current block in the macroblock according to a set of AC prediction rules when the AC prediction is enabled, wherein the set of AC prediction rules indicates how to selectively perform the AC prediction as follows:

differentially coding top row AC coefficients for the current block if the selected DC predictor is from the top block;

differentially coding left column AC coefficients for the current block if the selected DC predictor is from the left block; and

skipping differential coding of AC coefficients for the current block if DC prediction is skipped for the current block;

entropy coding results of the selectively performed DC prediction and AC prediction; and outputting results of the entropy coding.

27. (Canceled)

28. (Canceled)

29. (Original) The method of claim 26 further comprising, in a bit stream, signaling whether AC prediction is enabled for blocks in the macroblock.

30. (Original) The method of claim 29 wherein the macroblock is a frame macroblock, and wherein the signaling comprises sending a one-bit flag indicating whether AC prediction is performed for all blocks in the frame macroblock.

31. (Original) The method of claim 29 wherein the interlaced macroblock is a field macroblock, and wherein the signaling comprises sending a one-bit flag indicating whether AC prediction is performed for blocks in a first field in the field macroblock.

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32. (Original) The method of claim 31 wherein the signaling further comprises sending a one-bit flag indicating whether AC prediction is performed for blocks in a second field in the field macroblock.

33. - 60. (Canceled)

61. (Previously Presented) The method of claim 22 wherein the finding the DC differential comprises decoding an encoded DC differential.

62. (Canceled)

63. (Canceled)

64. (Currently Amended) One or more computer-readable media having stored thereon computer-executable instructions for causing one or more computers to perform a method comprising:

finding a DC differential for a current intra-coded block in ~~an intra-coded field of a~~ current macroblock of an interlaced video frame;

~~selecting a DC predictor from a group of candidate DC predictors, wherein the group of candidate DC predictors comprises DC values from blocks adjacent to the current block, wherein a candidate DC predictor is a missing candidate DC predictor if the candidate DC predictor is not intra-coded, and wherein the selected DC predictor is a non-missing candidate DC predictor; and~~  
among plural candidate blocks according to a set of DC predictor selection rules, wherein the plural candidate blocks include a top block above the current block, a left block left of the current block, and a top-left block above and to the left of the current block, and wherein the set of DC predictor selection rules indicates the selected DC predictor as follows:

if the top-left block, the left block, and the top block are intra-coded, the selected DC predictor depends on respective DC values of the top-left block, the left block, and the top block;

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if the top-left block is not intra-coded but the left block and the top block are intra-coded, the selected DC predictor depends on the respective DC values of the top block and the left block;

if the left block is not intra-coded but the top block is intra-coded, the selected DC predictor is the DC value of the top block;

if the top block is not intra-coded but the left block is intra-coded, the selected DC predictor is the DC value of the left block;

if the left block is not intra-coded and the top block is not intra-coded, DC prediction is skipped for the current block;

obtaining a DC value for the current block, wherein the obtaining comprises;

if DC prediction is skipped for the current block, using the DC differential as the DC value for the current block; and

if DC prediction is used for the current block, adding the selected DC predictor to the DC differential.

65. (Previously Presented) The computer-readable media of claim 64 wherein the finding the DC differential comprises decoding an encoded DC differential.

66. (Canceled)

67. (Currently Amended) The computer-readable media of claim 64 wherein ~~a candidate DC predictor is a missing candidate DC predictor if the candidate DC predictor~~ any of the plural candidate blocks that is outside a picture boundary is treated as not being intra-coded according to the set of DC predictor selection rules.

68. (Canceled)

69. (Currently Amended) One or more computer-readable media having stored thereon computer-executable instructions for causing one or more computers to perform a method comprising:

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selectively performing DC prediction for a current block in an interlaced macroblock, wherein the selectively performing DC prediction comprises selecting a DC predictor from among plural candidate blocks according to a set of DC predictor selection rules adding a selected DC predictor for the current block to a DC differential, wherein the plural candidate blocks include a top block above the current block, a left block left of the current block, and a top-left block above and to the left of the current block, and wherein the set of DC predictor selection rules indicates the selected DC predictor as follows:

if the top-left block, the left block, and the top block are intra-coded, the selected DC predictor depends on respective DC values of the top-left block, the left block, and the top block;

if the top-left block is not intra-coded but the left block and the top block are intra-coded, the selected DC predictor depends on the respective DC values of the top block and the left block;

if the left block is not intra-coded but the top block is intra-coded, the selected DC predictor is the DC value of the top block;

if the top block is not intra-coded but the left block is intra-coded, the selected DC predictor is the DC value of the left block;

if the left block is not intra-coded and the top block is not intra-coded, DC prediction is skipped for the current block; and

selectively enabling performing AC prediction for blocks the current block in the interlaced macroblock according to a set of AC prediction rules when the AC prediction is enabled, wherein the set of AC prediction rules indicates how to selectively perform the AC prediction as follows:

differentially coding top row AC coefficients for the current block if the selected DC predictor is from the top block;

differentially coding left column AC coefficients for the current block if the selected DC predictor is from the left block; and

skipping differential coding of AC coefficients for the current block if DC prediction is skipped for the current block.

70. (Canceled)

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71. (Canceled)

72. (Previously Presented) The computer-readable media of claim 69 wherein the method further comprises, in a bit stream, signaling whether AC prediction is enabled for blocks in the interlaced macroblock.

73. (Previously Presented) The computer-readable media of claim 72 wherein the interlaced macroblock is a frame macroblock, and wherein the signaling comprises sending a one-bit flag indicating whether AC prediction is performed for all blocks in the frame macroblock.

74. (Previously Presented) The computer-readable media of claim 72 wherein the interlaced macroblock is a field macroblock, and wherein the signaling comprises sending a one-bit flag indicating whether AC prediction is performed for blocks in a first field in the field macroblock.

75. (Previously Presented) The computer-readable media of claim 74 wherein the signaling further comprises sending a one-bit flag indicating whether AC prediction is performed for blocks in a second field in the field macroblock.

76. (Canceled)

77. (Canceled)

78. (Currently Amended) A system comprising:

means for finding a DC differential for a current intra-coded block in an ~~intra-coded field~~ of a current macroblock of an interlaced video frame;

means for selecting a DC predictor from a ~~group of candidate DC predictors, wherein the group of candidate DC predictors comprises DC values from blocks adjacent to the current block, wherein a candidate DC predictor is a missing candidate DC predictor if the candidate DC~~

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~~predictor is not intra-coded, and wherein the selected DC predictor is a non-missing candidate~~  
DC predictor among plural candidate blocks according to a set of DC predictor selection rules,  
wherein the plural candidate blocks include a top block above the current block, a left block left  
of the current block, and a top-left block above and to the left of the current block, and wherein  
the set of DC predictor selection rules indicates the selected DC predictor as follows:

if the top-left block, the left block, and the top block are intra-coded, the selected  
DC predictor depends on respective DC values of the top-left block, the left block, and  
the top block;

if the top-left block is not intra-coded but the left block and the top block are  
intra-coded, the selected DC predictor depends on the respective DC values of the top  
block and the left block;

if the left block is not intra-coded but the top block is intra-coded, the selected DC  
predictor is the DC value of the top block;

if the top block is not intra-coded but the left block is intra-coded, the selected DC  
predictor is the DC value of the left block;

if the left block is not intra-coded and the top block is not intra-coded, DC  
prediction is skipped for the current block; and  
means for obtaining a DC value for the current block, wherein the ~~means for~~ obtaining  
comprises:

if DC prediction is skipped for the current block, using the DC differential as the  
DC value for the current block; and

if DC prediction is used for the current block, means for adding the selected DC  
predictor to the DC differential.

79. (Previously Presented) The system of claim 78 wherein the means for finding the  
DC differential comprises means for decoding an encoded DC differential.

80. (Canceled)

81. (Currently Amended) The system of claim 78 wherein ~~a candidate DC predictor is a~~  
~~missing candidate DC predictor if the candidate DC predictor~~ any of the plural candidate blocks



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that is outside a picture boundary is treated as not being intra-coded according to the set of DC predictor selection rules.

82. (Canceled)

83. (Currently Amended) A system comprising:

means for selectively performing DC prediction for a current block in an interlaced macroblock, wherein the means for selectively performing DC prediction comprises selecting a DC predictor from among plural candidate blocks according to a set of DC predictor selection rules means for adding a selected DC predictor for the current block to a DC differential, wherein the plural candidate blocks include a top block above the current block, a left block left of the current block, and a top-left block above and to the left of the current block, and wherein the set of DC predictor selection rules indicates the selected DC predictor as follows:

if the top-left block, the left block, and the top block are intra-coded, the selected DC predictor depends on respective DC values of the top-left block, the left block, and the top block;

if the top-left block is not intra-coded but the left block and the top block are intra-coded, the selected DC predictor depends on the respective DC values of the top block and the left block;

if the left block is not intra-coded but the top block is intra-coded, the selected DC predictor is the DC value of the top block;

if the top block is not intra-coded but the left block is intra-coded, the selected DC predictor is the DC value of the left block;

if the left block is not intra-coded and the top block is not intra-coded, DC prediction is skipped for the current block; and

means for selectively enabling performing AC prediction for blocks the current block in the interlaced macroblock according to a set of AC prediction rules when the AC prediction is enabled, wherein the set of AC prediction rules indicates how to selectively perform the AC prediction as follows:

differentially coding top row AC coefficients for the current block if the selected DC predictor is from the top block;

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differentially coding left column AC coefficients for the current block if the selected DC predictor is from the left block; and  
skipping differential coding of AC coefficients for the current block if DC prediction is skipped for the current block.

84. (Canceled)

85. (Previously Presented) The system of claim 83 further comprising means for signaling in a bit stream whether AC prediction is enabled for blocks in the interlaced macroblock.

86. (Previously Presented) The system of claim 85 wherein the interlaced macroblock is a frame macroblock, and wherein the means for signaling comprises means for sending a one-bit flag indicating whether AC prediction is performed for all blocks in the frame macroblock.

87. (Previously Presented) The system of claim 85 wherein the interlaced macroblock is a field macroblock, and wherein the means for signaling comprises means for sending a one-bit flag indicating whether AC prediction is performed for blocks in a first field in the field macroblock.

88. (Previously Presented) The system of claim 87 wherein the means for signaling further comprises means for sending a one-bit flag indicating whether AC prediction is performed for blocks in a second field in the field macroblock.

89. (New) The method of claim 22 further comprising selectively performing AC prediction for the current block according to a set of AC prediction rules when the AC prediction is enabled, wherein the set of AC prediction rules indicates how to selectively perform the AC prediction as follows:

differentially coding top row AC coefficients for the current block if the selected DC predictor is from the top block;

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differentially coding left column AC coefficients for the current block if the selected DC predictor is from the left block; and

skipping differential coding of AC coefficients for the current block if DC prediction is skipped for the current block.

90. (New) The computer-readable media of claim 64 wherein the method further comprises selectively performing AC prediction for the current block according to a set of AC prediction rules when the AC prediction is enabled, wherein the set of AC prediction rules indicates how to selectively perform the AC prediction as follows:

differentially coding top row AC coefficients for the current block if the selected DC predictor is from the top block;

differentially coding left column AC coefficients for the current block if the selected DC predictor is from the left block; and

skipping differential coding of AC coefficients for the current block if DC prediction is skipped for the current block.

91. (New) The system of claim 78 further comprising means for selectively performing AC prediction for the current block according to a set of AC prediction rules when the AC prediction is enabled, wherein the set of AC prediction rules indicates how to selectively perform the AC prediction as follows:

differentially coding top row AC coefficients for the current block if the selected DC predictor is from the top block;

differentially coding left column AC coefficients for the current block if the selected DC predictor is from the left block; and

skipping differential coding of AC coefficients for the current block if DC prediction is skipped for the current block.